

Integrated Unit of Work

Title: Climate Trap

Focus: A unit that starts with weather and climate and develops the ideas associated with anthropogenic climate change. This unit also links energy with climate change.

Year Level: 6 VELS Level 4 (Activities based on estimated class number of 24)

Duration: 10 weeks

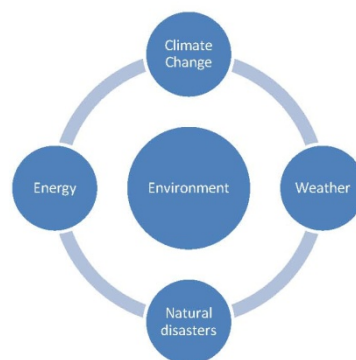
Host content area: Science (Environmental Science), Humanities (Geography)

Table 1. Unit planner template from: (Murdoch & Hornsby, 2009)

Rich concept - Environment

Key concepts- Topics

- Climate change (Environmental Education /Science and Technology)
- Weather watch (Science and Technology)
- Energy (Science and Technology)
- Fire, flood, famine (natural disasters) from (Murdoch & Hornsby, 2009)



Understandings

Topic:

- Weather is the short term state of the atmosphere usually recorded over hours or days, it is measured as: temperature, pressure and humidity.
- Climate is the average weather; it is considered to be the long term state of the atmosphere and is described for regions.
- The natural Greenhouse effect keeps our planet livable.
- The Anthropogenic Greenhouse effect causes increased warming due to human production of greenhouse gases. Climate change and the greenhouse effect are recognised phenomenon.
- There are skeptics who refute the existence and impact of human induced climate change.
- Energy is produced by burning fossil fuels the product of this is carbon dioxide (a greenhouse gas).
- Energy can also be produced from renewable energy sources.
- Individuals can act to reduce their impact on the environment.

Students:

Middle years students (Year 6) need to belong, they need to be engaged in learning and they have the ability and aptitude to guide their own learning. Middle Years students are concerned about environmental issues and would like to make a difference.

Curriculum

There is a natural link between environmental education and science and geography. Rich topics can be used to integrate many discipline areas and used for interdisciplinary learning.

Related values/attitudes/issues

During this unit the students are encouraged to explore their own ethical views. This is an environmental unit based on sustainability issues. The unit explores climate change from a scientific perspective but also includes the social impacts and individual responsibilities. This unit explores the view of climate skeptics and social media. The students are able to make informed choices and become environmentally aware, they can also take action to mitigate their impact on climate change.

Host content area outcomes:

Broader concept - sustainability - (i.e. ecofootprint can be taught in Science, Geography and Personal Learning)

<http://vels.vcaa.vic.edu.au/support/crosscurricular/sustainability.html>

Table 2 Demonstrates the sustainability issues with links to domain in VELs (Victorian Essential Learning Standards)

Outcomes for English and Mathematics

National curriculum <http://cms.curriculum.edu.au/litbench/build.asp?pg=3>

- Students should be able to describe, explain, instruct and argue a point of view by written and aural means

VELs <http://vels.vcaa.vic.edu.au/support/progression/english.html#lev4>

- Students should be able to prediction, support with evidence, use multimodal and a variety of texts. Student should be able to asking questions, speak listen and respond others.

NSW http://k6.boardofstudies.nsw.edu.au/files/english/talk_k6engsamples_syl.pdf

- Students should be able to respond to issues, use a wide range of texts and respond to audience.

National curriculum http://cms.curriculum.edu.au/numbench/bench_yr7b.HTM

- Measurement and data sense Collect data, recognise chance, be able to make measurements.
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NSW http://www.boardofstudies.nsw.edu.au/syllabus_sc/mathematics.html

- Use mathematics to solve problems, create graphs from Data.

VELs <http://vels.vcaa.vic.edu.au/support/progression/maths.html#lev4>

- Application of mathematics to solve simple problems. Knowledge of interpretation of maps, graphs and models. Application of a set of questions linked to an area of investigation.

<p>Assessment routines and records (Formative and summative)</p>	<ol style="list-style-type: none"> 1. Journal - individual learning journal for each student. 2. In the back of the journal record a weather journal and record the weathers impact on students i.e. sport cancelled or sunburn. 3. Data collection for temperature - high and low and rain gauge measurements for eight weeks - graphs at the end of eight weeks. 4. Spelling words from brainstorming and supplemented from focused spelling lists - each week the list is chosen on Monday and the test is on Friday. 5. Students complete a KWL chart (Know? Want to Know? How will I find out? What did I learn?) - Initially for environmental knowledge and climate knowledge and they fill the chart in over the ten weeks. 6. Research and interactive website activities- assessed by output. 7. BOM (Australian Bureau of Meteorology) site lesson online and spinning pie charts on chance modeled and then completed in pairs - can get these results. 8. Students predict rain fall for the next week and record their predictions in their weather journals. 9. From a meteorology website Wizkids (not BOM) each students finds an issue or phenomena and list a few interesting facts - in Journal assessed. 10. Sitting in an informal circle students discuss their list of facts, not provided with extensive feed back when in the circle - later feedback. 11. Free rice website - games based on quiz questions for geography, mathematics and english. Students work in pairs and can record their scores for each of the disciplines. May need to use a higher difficulty level or do more research. 12. Why is the Free Rice website a good idea? ½ page response to the question. 13. Research and construct environmental footprints based on per capita or total production of carbon dioxide. Footprints are large paper on cardboard with sized to scale. 14. Student conducted mock TV interviews on Climate Change interviewing either a scientist, a skeptic or another person. Interview in groups of 3. 15. KWL - initially for Energy and to complete by end of unit. 16. List energy use in school and home (list in journal). 17. Rap or community announcement advertisement groups of 6. 18. Review Interviews as a whole class 19. Audience for the presentation of a rap or advertisement using the whiteboard (gauge students engagement - live performances). 20. Collage of response to energy use and climate change. 21. Timeline looking at human life time and putting temperature change into perspective. 22. Write letter to a grandchild telling them your response to climate change. 23. Glossary pooled class resources over the ten weeks. 24. Mathematics Life Skills assessment sheet to be used during the unit and completed at the end.
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<p>Tuning in and preparing to find out:</p> <p>Assess prior learning Engage all students</p>	<ol style="list-style-type: none"> 1. Students brainstorm to develop ideas on the whiteboard regarding weather, climate and climate change. 2. Journal - individual learning journal for each student. In the back of the journal record a weather journal and record the weathers impact on students i.e. sport cancelled or sunburn. 3. Students fill out KWHL chart for Climate Change and weather. 4. The spelling list comes from the brainstorming and is supplemented with words that will be included in a end of unit glossary. Spelling list Monday and test Friday. For each week. 5. Introduction and discussion on rain gauge, practice measuring with coloured water. Work out where to leave the thermometer (list reasons in journal). 6. Introduction and discussion on high, low thermometer - can explore how it works by online research set up spreadsheet for data collection. Students explore the high, low thermometer and discuss the consequences of no data collection on the weekend (should they be encourage to share by taking it home to record measurement). 7. Data collection for temperature - high and low and rain gauge measurements for eight weeks to produce graphs. 8. Students explore weather related terms on the Wizkids website and list three points to share with the class. Sitting in an informal circle students discuss their list. 9. Brainstorming from week one strategic questioning and feedback to gauge student understanding. 10. Students explore rainfall variability and unpredictability with the spinning pie charts. 11. Students complete the BOM lesson on rainfall predictability. 12. Students look at the BOM website and set up their own weather predictions for the next week. 13. Students predict rain fall for the next week. 14. New week check predictions from last week look at temperature and rainfall records and discuss. 15. Complete lesson plan on BOM website. 16. Each day week 2 go outside and look for clouds- compare clouds online and by brainstorming. 17. Look at water cycle on interactive whiteboard.
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<p>Finding out:</p> <ol style="list-style-type: none"> Keep routines from previous week- rain gauge measurements, temperature measurements and data entry, topical spelling lists and journal entries. Students review KWHL chart on climate and weather. Brainstorm climate change and produce a diagram on the whiteboard as a whole class - keep diagram in OneNote for journals. Students work in groups of three to research climate change and the views of either; scientists, skeptics or the general public, they use expository writing to produce questions for a mock TV interview. Also view the anti carbon tax ads and discuss in class. Think about persuasive and exploratory language use. http://www.getcarbonpolicyright.com.au/ Address the questions - What is knowledge and how is it constructed? How do the scientists know? Why are there skeptics? Are you a skeptic? What does the general population know about climate change? http://www.getcarbonpolicyright.com.au/the-facts.aspx?qclid=CNqOjui_16sCFSFNp_godmEWEOW Students start the Interview assignment. Students decide on the roles interviewer, interviewee or camera operator, all the students need to produce the questions and answers. Possible interviewee roles: scientist, skeptic or another member of society (they choose). Start research on questions as a group of three. By the end of the week students present the interview on a digital camera, ipod or iphone. Online quiz and activities. Climate education website review the students interests to choice lessons from the 	<p>Sorting out:</p> <ol style="list-style-type: none"> Keep routines from previous week- rain gauge measurements, temperature measurements and data entry, topical spelling lists and journal entries. Brainstorm ecological footprint. Go to the website http://en.wikipedia.org/wiki/List_of_countries_by_carbon_dioxide_emissions. Explicitly teach percentages, fractions and scale for Mathematics to use in unit. In pairs students cut out an ecological footprint each for a randomly assigned country to represent that countries emission per capita or total. All student use the same measure so the ecological footprints can be labelled by country and placed on a world map to produce a wall chart. They then choose a second country to represent with a footprint. Students investigate the ecological footprint of several countries by per capita measurements and total carbon dioxide emissions. Students find out the impact of climate change to other countries. Class explores the Free Rice site. Model Free Rice quiz site on the Whiteboard and then students work in pairs and complete the English vocabulary quiz and the Geography 'Identify Countries on a Map', they may use a map for assistance and they may work together. http://www.freerice.com/#/english-vocabulary/1503 The results of the quiz are recorded in student journals Keep routines from previous week- rain gauge measurements, temperature measurements and data entry, topical spelling lists and journal entries. KWHL - initially for Energy and to complete by end of unit. Brainstorm energy production and produce a mind map on the whiteboard. Connect pictures to the labels on the whiteboard using the Smartboard functions. Review the mind map and see if anything has been missed. Save the file and print for journals. Contrast the differences between non-
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site.

<http://www.bom.gov.au/lam/climate/index.htm>

Complete the worksheets.

Let the students explore the site.

28. Keep routines from previous week- rain gauge measurements, temperature measurements and data entry, topical spelling lists and journal entries.

29. As a class explore the Global Climate Change site.

<http://www.epa.gov/climatechange/kids/basics/index.html>

30. Use the interactive whiteboard to gauge student understanding do the activity clues to climate change with students taking turns, student driven. List the clues in a table in the journal. Make the connection between climate change and natural disasters.

31. Brainstorm and introduce disasters based on the previous knowledge. Use the previous website to explore extreme weather and natural disasters.

32. Disasters website for floods and bottle tornado. Experiment Bottled tornado record in journal follow the CSIRO site. Link with CSIRO activity Bottles tornado

<http://www.csiro.au/resources/bottled-tornado-activity.html>

33. Discuss the impact of these disasters on other cultures. Natural link to Global ED.

34. Complete the quiz in Global ED quiz builder - The Big Melt - students work in groups of three and help each other, they may need to research the answers.

<http://www.globaleducation.edna.edu.au/globaled/quiz?action=viewQuiz&quizId=1262>

35. Students research a natural disaster and write a persuasive argument to warn the community to leave the area. I could be bushfire, flood etc. Be aware of students who may have been impacted by a disaster.

renewable and renewable energy.

48. Make list for each. Draw the basic diagram of energy conversion from coal to electricity on the whiteboard. Students draw in journals and label.

49. Experiment with solar models in groups of three students. Students make one of the models and detail the process in their student journals. They then make the other models in the kit.

6 - in - 1 Solar Educational Kit

<http://www.jaycar.com.au/productView.asp?ID=KJ8926>

50. If there is no sunlight use a light globe. Measure how far you model moves or spins per unit of time.

51. Record this in the journal for discussion. Shade some of the panel and see the difference.

52. Whole class discussion on the model building activity.

53. Keep routines from previous week- rain gauge measurements, temperature measurements and data entry, topical spelling lists and journal entries.

54. As a class read the school environmental or sustainability policy. Note key points.

55. Discuss the difference between country energy use, school energy use and individual energy use. Review the ecological footprints and see if students can explain the process.

56. Students produce a collage (poster) of pictures in groups of three that address energy minimization, climate change and promote ecological sustainable practices i.e. solar panels, new light globes, riding a bike. The ecological footprint poster.

57. Graph data collected for temperature and rainfall collected over the last eight weeks is analysed. First by producing a graph on the whiteboard.

<http://nces.ed.gov/nceskids/createagraph/default.aspx?ID=c7b6ac57fd31437f876a3d37f1f4799c> Discuss results, look for variability and place in journals.



<p>Making connections Activities to 'pull the unit together'. To assist students to : demonstrate what they have learned and reflect on their learning.</p>	<p>58. No weather data to collect. Still need spelling list. 59. Revision on weather, climate and energy. Edit KWHL charts for weather and energy. Review sustainability. 60. Review process required for mock TV interviews. 61. Plan in groups of 6 for climate Rap or Community advertisement on climate change. Three minute production. 62. Establish roles and jobs for the production. All contribute to the text. Record roles and jobs in student journals. 63. Work in co-ordination with the music teacher or parent helper. 64. Students choose the music for either activity. 65. Work on the production. 66. Rehearse the production - practice recording the clips, look at the rehearsal and make improvements. 67. Plan for the following weeks presentation.</p>
<p>Action: Activities to link theory to practice. To empower children to act on what they have learned and make links to their daily lives.</p>	<p>68. No weather data to collect. Still need spelling list. 69. Preparation for performance. 70. Production of the Rap or advertisement. 71. As a class review the performances and compare with the interviews. 72. For the review process of the productions ask the questions <ul style="list-style-type: none"> • Did these activities produce a response? • Does the audience understand the issues more thoroughly? • Who created the clip? • What message did they present? • How have they created the message? • How might others interpret the clip? • What bias, values, ethics ideas are being presented? • Is there an underlying message? Answer these questions in the student journal. 73. Produce at time line for your life include your grandparents and estimate (project) the timeline for your grandchildren. 74. Research on letter writing. 75. Students perform research on the projections for Climate Change in the local area http://www.climatechangeinaustralia.gov.au/. 76. Students write a letter to their grandchild to tell them how they responded to the climate change issue. 77. Pool glossary produced over the ten weeks. 78. Mathematics Life Skills assessment sheet to be used during the unit and completed at the end.</p>

Going further: Activities to challenge and extend\

Activities to engage for early finishers
The Weather Channel Kids.

<http://www.theweatherchannelkids.com/weathered/teacher-resources/>

esa kids earth

<http://www.esa.int/esaKIDSen/Earth.html>

Resources

Computer and internet access

Playback video recording on a digital camera, ipod or iphone, playback through Smart board and software.

Standard classroom material, cardboard, paper etc

Websites have been included in the text.

There are many websites listed - these activities can be expanded upon or reduced depending upon class aptitude and available time.